

REMARKS/ARGUMENTS

Applicants have received and carefully reviewed the Office Action of the Examiner mailed November 6, 2006. Claims 1-34 remain pending, with claims 1-9 and 17-25 withdrawn from consideration. Claims 10, 13, and 26 have been amended. Support for the amendments is found in the specification, claims, and drawings as originally filed. No new matter has been added. Reconsideration and reexamination are respectfully requested.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 10-16 and 26-34 are rejected as indefinite for reciting "diameter similar to a thickness". Independent claims 10, 13, and 26 have been amended to clarify that the thickness of the ball is similar to the diameter of the ball. The specification as originally filed provides support for this amendment at, for example, page 3, lines 22-23. Withdrawal of the rejection is respectfully requested.

Rejection under 35 U.S.C. § 103(a)

Claims 26-28, 30, 33, and 34 remain rejected as being unpatentable over Son et al. (US 2004/0161929). Applicants traverse the rejection.

The Examiner acknowledges that Son et al. fail to teach a catalyst island formed by exposing catalytic material to a temperature sufficient to form a ball having a similar diameter and thickness. The Examiner states that process limitations are not indicative of patentability of a claim to the product wherein the product is otherwise taught. Applicants point out that the product of the claims is not otherwise taught by Son et al. because Son et al. do not appear to teach a catalyst island formed in a ball having similar diameter and thickness. The Examiner goes on to assert that having the catalyst in a ball shape is considered a design choice. Applicants respectfully disagree.

MPEP 2113 states:

The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart

distinctive structural characteristics to the final product. See, e.g., *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979)

It appears that the Examiner is considering both the way the catalyst islands are formed and the structure of the catalyst islands themselves as being merely design choices. The Examiner has not, however, provided any reasoning as to why one of ordinary skill in the art would have been motivated to modify the structure of Son et al. to achieve the claimed structure.

MPEP 2143.01 III states:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)... Although a prior art device 'may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.' 916 F.2d at 682, 16 USPQ2d at 1432.).

Emphasis in original. It appears the Examiner is asserting that it would have been obvious to modify Son et al. to have a catalyst island formed in a ball having a diameter and thickness of similar dimension because such a modification is possible. Applicants submit that this is not proper grounds for obviousness. Further, the specification teaches at, for example, page 2, lines 9-13, states that the metal islands support the successful growth of nanotubes on a resulting structure for a reliable electrical connection to the nanotubes. The specification also teaches at, for example, page 3, lines 19-24, that the "islands may be formed by exposing a thin metal such as iron (Fe) to high temperatures in an inert environment. At these high temperatures, the thin metal may ball up to form islands of a diameter on the order of the thickness. Small islands may yield single wall small diameter nanotubes." The specification thus teaches the significance and functionality of the catalyst island formed in a ball, as is recited in the claims. The catalytic material formed in a ball is thus not a "design choice" as asserted by the Examiner.

In response to Applicants' previous arguments, the Examiner asserts that "in contact" is open to intervening layers, thus the claims do not require the layers be directly deposited onto one another. Applicants submit that while "in contact" may be open to including additional layers, the claims actually recite "deposited on" and "formed in and on", which indicates to one of ordinary skill in the art that a material "deposited on" or "formed on" a previous layer is

directly on that previous layer. Additionally, MPEP 2111, citing *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997), states:

PTO applies to verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in applicant's specification.

(Emphasis added). Applicants submit that the broadest reasonable meaning, taking into account the teachings of the specification, of "deposited on" indicates the material that is "deposited on" another layer is deposited directly on that layer. For at least the reasons set forth below, Son et al. do not appear to teach an island of catalytic material formed in an on vias through a passivation material to a conductive material, as is recited in the independent claim. The structure of Son et al. appears to be as follows, with the layers shown in order of application corresponding to FIGS. 7-10, relied on by the Examiner:

passivation layer 460
gate electrode 450
insulator layer 440
barrier layer 430
resistor layer 420
emitter electrode 410
substrate 401

Son et al. teaches that after formation of the above structure, shown in FIG. 7, a gate hole is etched. See paragraphs [0039] to [0041]. Son et al. then teach forming a catalyst layer 510, 515 over the entire barrier layer 430 exposed in the etched gate hole. See paragraph [0042] and FIG. 7. Son et al. then teach depositing protective layer 620 over the catalyst layer, followed by selective removal of the protective layer and portions of the catalyst layer 515 to expose catalyst layer 510 in gate hole 465. See paragraphs [0043] to [0048] and FIGS. 8-9. Son et al. do not appear to teach forming an island of catalytic material by exposing catalytic material to a temperature sufficient to form a ball having a diameter similar to a thickness, as is recited in independent claim 26.

Additionally, there is no motivation for one of ordinary skill in the art to modify the device of Son et al. to achieve the claimed apparatus, and the Examiner has not provided any motivation for making such a change to the device of Son et al. Son et al. do not appear to teach or suggest each and every element of independent claim 26 or the claims dependent thereon. Reconsideration and withdrawal of the claims are respectfully requested.

Claim 26 is rejected as being unpatentable over Lee et al. (US 6,339,281 B2). Claims 26 and 27 are rejected as being unpatentable over Hsu (US 6,890,233 B2). The Examiner acknowledges that neither Lee et al. nor Hsu teaches a catalyst island formed by exposing catalytic material to a temperature sufficient to form a ball having a diameter and a thickness wherein the diameter is similar to the thickness, as is recited in the claims, but asserts that process limitations are not indicative of patentability of a claim to the product wherein the product is otherwise taught, and that the shape of the catalyst is merely a design choice.

Neither Lee et al. nor Hsu teaches the product otherwise taught with respect to the process of forming the catalyst island. Additionally, as discussed above, the specification teaches the significance and functionality of the catalyst island formed in a ball, as is recited in the claims. The catalytic material formed in a ball is thus not a "design choice" as asserted by the Examiner. Neither Lee et al. nor Hsu thus teaches nor suggests each and every element of the claims. Further, there is no motivation for one of ordinary skill in the art to modify the structure of Lee et al. or Hsu to achieve the claimed apparatus. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 10-16, 28, and 29 remain rejected as being unpatentable over Son et al. in view of Shen et al. (US 6,143,474) and further in view of Zenke et al. (US 5,187,557). For at least the reasons set forth above, Son et al. do not appear to teach the claimed structure of a catalyst island formed as a ball having a similar diameter and thickness. Neither Shen et al. nor Zenke et al. appear to teach what Son et al. lack. Additionally, there is no motivation for one of ordinary skill in the art to modify Son et al., Shen et al., or Zenke et al. to achieve the claimed structures.

The Examiner asserts that Son et al. disclose a hole through the passivation layer to the TiN layer where the catalytic island is formed, referring to element 510 of figures 8-10. Figures 8-10 of Son et al., however, clearly show element 510 is a catalyst layer formed inside a gate hole 465. Son et al. do not appear to teach a catalyst island formed in a ball, as is recited in

independent claims 10 and 13. Neither Shen et al. nor Zenke et al. appear to teach this element or provide reasons or suggestions for modifying Son et al. to include such an element. As discussed above, the structure of the catalyst island is functional and is not taught or suggested by the cited prior art. Further, there is no motivation for one of ordinary skill in the art to modify Son et al. to include such a structure.

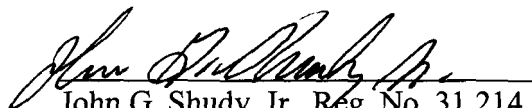
Further, even if one did combine the teachings of Son et al, Shen, and Zenke et al., the resulting device would appear to be a single layer resistor, and not the structure recited in the claims. None of Son et al., Zenke et al., or Shen appear to teach or the structure as recited in independent claims 10 and 13, or the claims dependent thereon. Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 31 remains rejected as being unpatentable over Son et al. in view of Gossen (US 5,710,656) or Liu et al. (US 6,268,615). Claim 32 remains rejected as being unpatentable over Son et al. in view of Shen. For at least the reasons set forth above, Son et al. do not appear to teach the basic elements of independent claim 26, as amended, from which claims 31 and 32 ultimately depend. None of Gossen, Liu et al. or Shen appears to provide what Son et al. lack. Thus, any combination of Son et al., Gossen, Liu et al., or Shen also fails to teach or suggest the elements of claims 31 and 32. Reconsideration and withdrawal of the rejections are respectfully requested.

Reconsideration and reexamination are respectfully requested. It is submitted that, in light of the above remarks, all pending claims are now in condition for allowance. If a telephone interview would be of assistance, please contact the undersigned attorney at 612-677-9050.

Respectfully submitted,

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